Potato Research Activities

The potato sector has three research activities with the Canadian AgriScience Cluster for Horticulture Cluster 4. These three activities are focused on sustainability, soil health and finding new potato varieties for growers across Canada.

THE CLUSTER 4 POTATO RESEARCH ACTIVITIES ARE:

ACTIVITY 11

National potato variety evaluation for sustainability, resilience and climate change

LEAD RESEARCHERS – Erica Fava, national potato variety trial coordinator and industry liaison; Jen McFarlane, soft fruits IPM coordinator and research coordinator with E.S. Cropconsult; and Katerina Jordan, associate professor at the University of Guelph

ACTIVITY 12

Regenerative and sustainable agriculture for climate change adaptation and carbon sequestration: rebuilding soil health and increasing crop productivity of Canadian potato production systems

LEAD RESEARCHER – Claudia Goyer, research scientist with Agriculture and Agri-Food Canada at the Fredericton Research and Development Centre

ACTIVITY 13

Positioning Canada's potato industry for improved sustainable production

LEAD RESEARCHER – Mario Tenuta, senior industrial research chair in 4R nutrient management and professor of soil ecology at the University of Manitoba

This project is generously funded through the Canadian AgriScience Cluster for Horticulture 4, in cooperation with Agriculture and Agri-Food Canada's AgriScience Program, a Sustainable Canadian Agricultural Partnership initiative, the Fruit and Vegetable Growers of Canada (FVGC), and industry contributors.

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Canada

National Potato Variety Evaluation for Sustainability, Resilience and Climate Change

LEAD RESEARCHERS

Erica Fava
National potato variety trial coordinator and industry liaison

Jen McFarlane
Soft fruits IPM coordinator and research coordinator with E.S. Cropconsult

Katerina Jordan
Associate professor at the University of Guelph

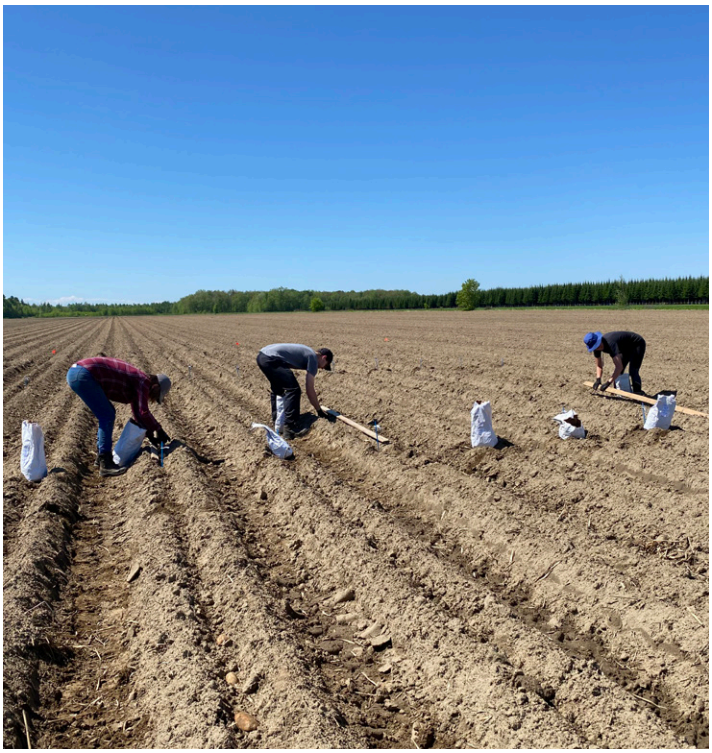
The national potato variety evaluation is working to boost profits and sustainability for the Canadian potato industry by finding new potato selections with improved productivity, disease resistance and climate resilience. New selections are being compared to currently grown potato varieties across the major potato production areas of Canada.

Over the past winter, trial coordinators attended local meetings to provide updates to industry on the trial. Additionally, meetings were held with trial coordinators to discuss improvements that could be made for the growing season. At some trial sites, researchers conducted processing quality assessments on the lines in storage.

Three chip lines, F180085-04, F170084-09 and F160032-06, which store well for chip processing, were selected for a more detailed new storage/processing study in Ontario. Assessing ideal storage temperatures for new chipping varieties is a complementary project that will help predict storage potential.

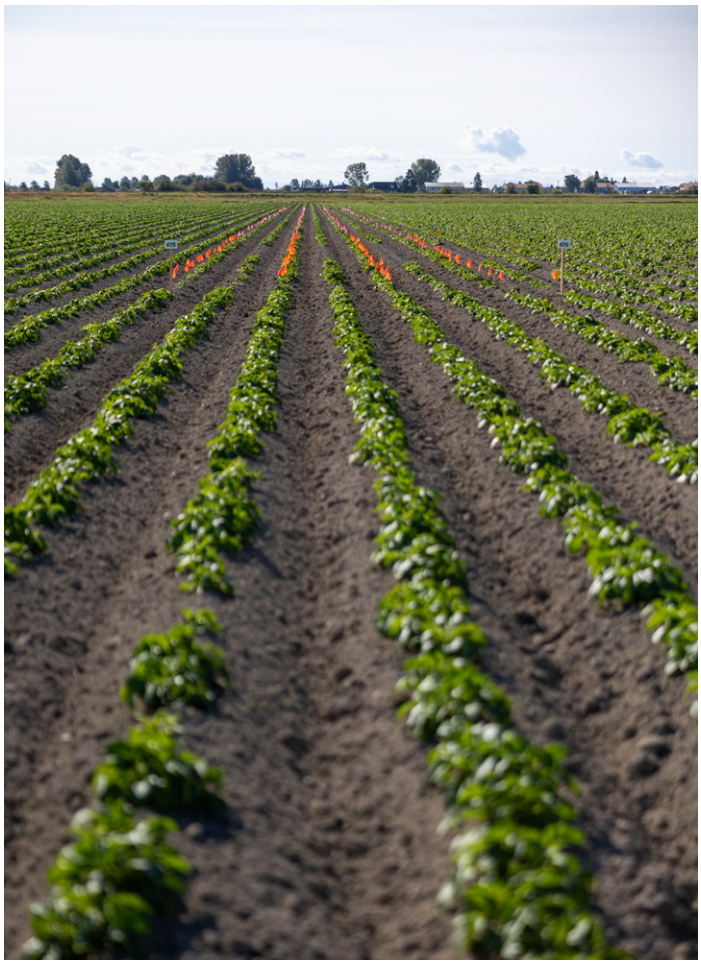
For the 2025-2026 year, all sites have been planted, and trial coordinators have started gathering field and agronomic data. Agriculture and Agri-Food Canada's (AAFC) breeding program chose six lines to graduate from the trials and put into industry trials for 2025. Many of these lines carry disease resistance, have early maturity and good dormancy, and have very good processing quality in storage.

The researchers are continuing to evaluate the processing quality of lines from the 2024 trials. Three french fry lines (VF170093-09, VF19046-16 and VF19001-04) and two chip lines (F180085-04 and VF19010-22) from the AAFC breeding program have had consistently good colour through eight months in storage at 7 C.



Planting potato trials for the 2025 growing season at Ste-Marie-Salomé, Que. Photo: Sophie Massie

Several lines were also selected for a heat tolerance trial in Simcoe, Ont. Based on this trial, several lines were identified as showing promise as heat tolerant lines. A fresh market red line, VF180073-13, produced the highest yields in the trial. VF170114-01, a fresh market red, and VF140855-07, a french fry type, also had yields higher than other checks. All three of these lines produced attractive tubers and high marketable yields and are in the 2025 trials or are being evaluated by industry.



Potato trials at Delta, B.C. Photo: Toban Dyck

A potato plant at the trials in Delta, B.C. Photo: Toban Dyck

KEY TAKEAWAYS:

- Three chip lines, F180085-04, F170084-09 and F160032-06, which store well for chip processing were selected for a more detailed new storage/processing study in Ontario.
- Three french fry lines and two chip lines from the AAFC breeding program have shown consistently good colour throughout eight months in storage at 7 C.
- As part of a heat tolerance trial in Simcoe, Ont., several lines were identified as showing promise as heat tolerant lines.

Regenerative and Sustainable Agriculture for Climate Change Adaptation and Carbon Sequestration: Rebuilding Soil Health and Increasing Crop Productivity of Canadian Potato Production Systems

LEAD RESEARCHER

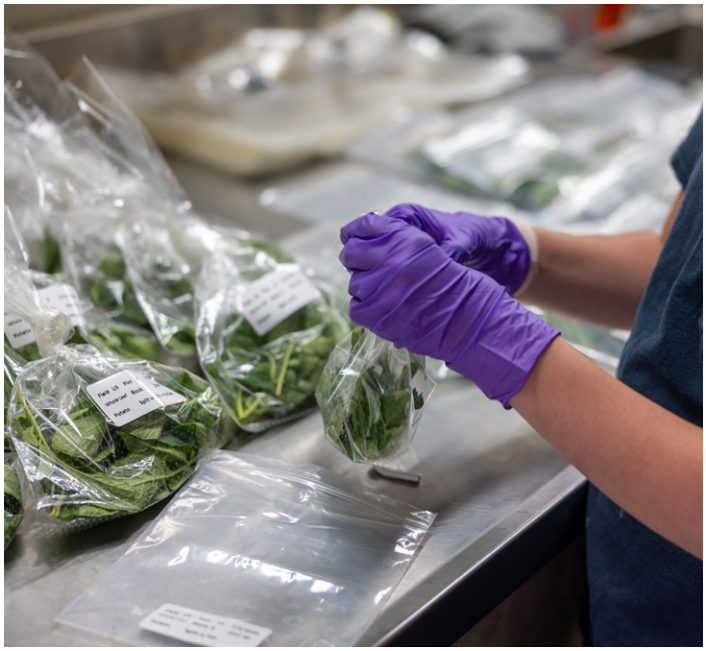
Claudia Goyer
Research scientist with Agriculture and Agri-Food Canada at the Fredericton Research and Development Centre

Regenerative and sustainable agricultural practices (RSAPs) are being studied in several locations across Canada to mitigate soil degradation and loss of bio-diversity caused by intensive farming practices and ensure long-term viability of potato farms.

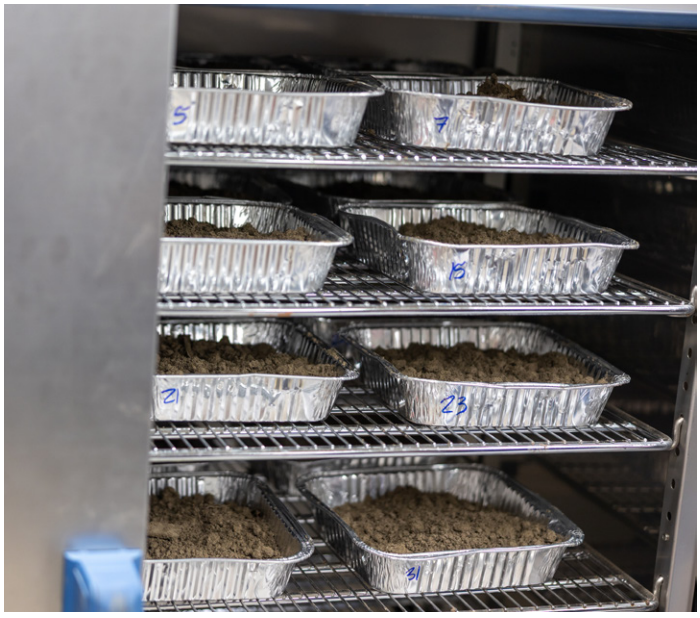
Trials conducted at McCain Foods Farm of the Future in New Brunswick are showing multispecies mixes not only increased soil health but ensured a tighter cycling of nutrients, thus reducing carbon dioxide and nitrous oxide losses to the atmosphere. Researchers also found a longer crop rotation with perennial multispecies mix improved soil health indicators. Disease risk was also reduced with potato early dying (PED) severity and the abundance of *Verticillium dahliae* was found to be lower in more diversified crop rotations. Trials are ongoing to see how test results vary in different environmental systems.

In Quebec, trials are testing how a two-year potato system using multi-species service crop as green manure under reduced tillage and fall/spring cover crops compares to a conventional two-year system of potatoes and corn/soybeans. Another trial is testing two RSAPs crop production systems. These include a cash crop in the spring of the first rotation year followed after harvest by a multi-species service crop mixture, and a mix of annual and perennial species sown as cover crops until the next spring with a green manure plant species mixture planted as a fall/spring cover crops until the seeding of potato crops in the next spring.

The team in Ontario is testing the effect of improved crop production systems with greater plant diversity and fumigation compared to unfumigated soils under a continuous potato on soil quality and biodiversity, crop growth and productivity and disease management. This growing season, seven trials were established at four



Bagging plant samples for testing at Agriculture and Agri-Food Canada Fredericton Research and Development Centre.
Photo: Toban Dyck

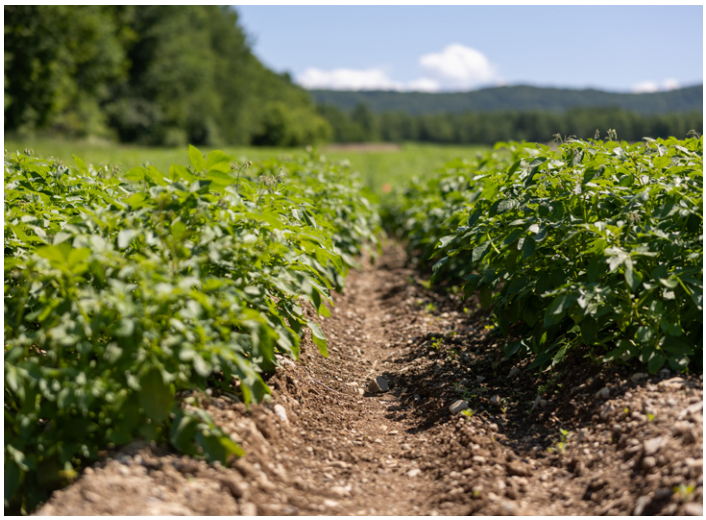


Soil samples at Agriculture and Agri-Food Canada Fredericton Research and Development Centre. Photo: Toban Dyck

experimental hubs and trials at 18 flagship farms were also planted. Collection of plant, soil and gas samples is ongoing.

KEY TAKEAWAYS:

- Trials are showing multispecies mixes not only increase soil health but ensure a tighter cycling of nutrients, reducing greenhouse gas losses to the atmosphere.
- A longer crop rotation with perennial multispecies mix was found to improve soil health indicators.
- Disease risk was reduced with potato early dying (PED) severity and the abundance of *Verticillium dahliae* was found to be lower in more diversified crop rotations.



Potato rows at McCain Farm of the Future in Riverbank, N.B.
Photo: Toban Dyck

Positioning Canada's Potato Industry for Improved Sustainable Production

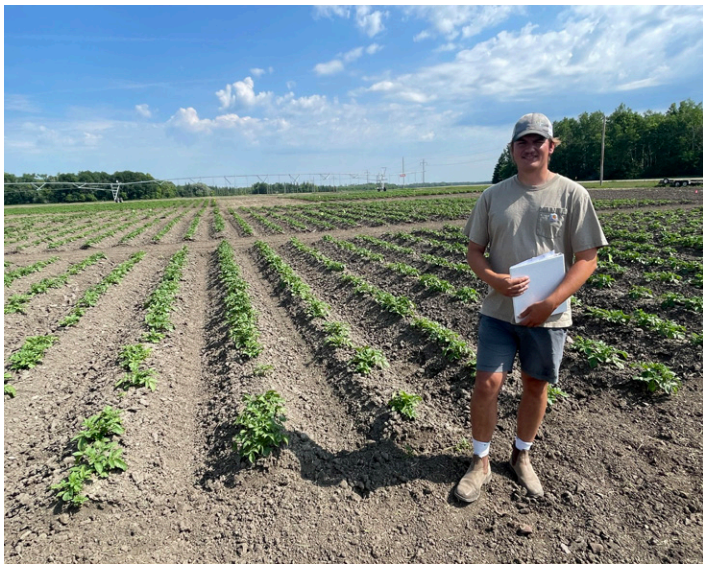
LEAD RESEARCHER

Mario Tenuta
Senior industrial research chair in 4R nutrient management and professor of soil ecology at the University of Manitoba

This research activity is studying ways to improve nitrogen use efficiency in Canadian processing and table potato production. The research team is working to determine the environmental and agronomic performance indicators for fresh and processing potatoes in Canada. Emissions efficiency and nitrogen management practices on potato farms across the country are being tested.

The research activity is in its second of three years of field trials. Trials are taking place in Alberta, Manitoba, New Brunswick and Prince Edward Island. Researchers added different rates of nitrogen fertilizer to standard varieties of table and processing potatoes and newer suspected higher nitrogen use efficient varieties. Researchers found the newer higher nitrogen efficient varieties are generally out yielding standard varieties. More yield is obtained with less of an increase in nitrogen additions than with the standard varieties.

The nitrification inhibitor, eNtrench, has been found to generally reduce N_2O emissions. The exception was the 2024 trial in Alberta where the field had a lot of residual nitrogen from previous legume forage production. With table potatoes, the newer high nitrogen efficient variety, Musica, is drastically out yielding checks. However, it does this with more nitrogen added. Researchers are working to confirm this year if it is actually more nitrogen efficient.



Chris Hoffman at his potato processing trial near Portage la Prairie, M.B. Photo: Mario Tenuta

KEY TAKEAWAYS:

- Newer higher nitrogen efficient potato varieties are out yielding standard varieties. More yield is obtained with less of an increase in nitrogen additions than with the standard varieties.
- The nitrification inhibitor, eNtrench, has been found to reduce N_2O emissions.
- The newer high nitrogen efficient variety, Musica, is drastically out yielding checks, but it does this with more nitrogen added. Researchers are working to confirm this year if it is actually more nitrogen efficient.